

<b>NWS FORM E-5</b> U.S. DEPARTMENT OF COMMERCE	HSA OFFICE: <b>San Juan, PR (SJU)</b>
SERVICE  <b>MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS</b>	REPORT FOR (MONTH / YEAR): <b>April, 2004</b>
TO: NATIONAL WEATHER SERVICE HYDROMETEOROLOGICAL INFO CENTER, W/OS31 SSMC 2 – Room 13468 1325 EAST-WEST HIGHWAY SILVER SPRING, MD 20910-3283	DATE: <b>May 10, 2004</b>  SIGNATURE: Peter Corrigan
When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).	

**Summary:** April in Puerto Rico and the U.S. Virgin Islands was near normal in overall precipitation and despite several fairly heavy rainfall events there was no large-scale flooding. There were a number of hydrologic events requiring Flash Flood Warnings and Urban/Small Stream Flood Advisories, but no gaged stream locations exceeded flood stage. San Juan WFO had 3.07" of rainfall, compared to the 1971-2000 mean of 3.71". Monthly rainfall totals across the island estimated by the Southeast River Forecast Center ranged from over 12 inches in portions of southwest Puerto Rico to less than an inch over parts of the south central island and a pocket around the north central island (see Fig. 1 at end of document).

Scattered showers with isolated heavy amounts fell during the afternoon and overnight hours of April 4-5. An Urban and Small Stream Flood Advisory was issued in the early afternoon for most of the southern half of Puerto Rico, although no reports of flooding were received. Rainfall was heaviest in the Rio Grande de Loiza and Rio Grande de la Plata basins in the eastern half of the island. Aibonito (AIBP4) had 24-hour rainfall of 5.27" followed by 2.05" at Naranjito (NAMP4). Moderate stream rises were observed in parts of these basins, although bankfull or flood stage was not exceeded at any locations.

Some fairly intense localized rains fell over the central and northeast portions of the island during the afternoon and evening of the 7<sup>th</sup>, prompting the issuance of several Urban and Small Stream Flood Advisories. Included was the San Juan metro area, where 1.22" fell in about an hour. This represented a new 24-hour record for the date, breaking the old record of 0.46" set in 1964. Several locations in the Rio de la Plata and Rio Grande de Loiza basins picked up in excess of 2 inches, including Aibonito (AIBP4), 4.15", Rio de Bayamon below Cidra (CIEP4), 3.36", Toa Alta (NARP4), 2.69" and Naranjito (NAMP4), 2.23". Sharp rises were observed on some smaller streams in these river basins, most notably the Rio Guadiana at Guadiana (NRPP4). This 8 mi<sup>2</sup> basin rose from under 20 cfs (cubic feet per second) to over 1700 cubic feet per second (cfs) in a matter of 30 to 45 minutes. Stage rose from around 3 feet to 7.55 feet.

Generally dry conditions prevailed for the period from the 9<sup>th</sup> to 11<sup>th</sup>, with only widely scattered diurnally-driven shower activity. An isolated intense shower on the afternoon of the 13<sup>th</sup> prompted the issuance of an Urban and Small Stream Flood Advisory for the municipality of Penuelas in southwest Puerto Rico. Radar estimated rainfall approached 4 inches in several hours over a very small area, although there were no rain or stream gages in the vicinity to corroborate the radar

estimates.

Primarily dry conditions prevailed for the next 4 to 5 days as high pressure surface and aloft suppressed the development of even the normal diurnal pattern of shower activity. By mid-month it was evident that rainfall over southeast Puerto Rico was falling behind normal levels and this was reflected in reduced stream flows in this area. River gages in several basins including the Rio Grande de Patillas, Rio Maunabo, and upper Rio Grande de Loiza reached new lows for the date on the 15<sup>th</sup> and 16<sup>th</sup>.

A return of low level moisture mostly associated with a front located over Hispaniola commenced on the 16<sup>th</sup> and combined with a weak trough helped to produce shower activity over the western cordillera on the 17<sup>th</sup> and 18<sup>th</sup>. A more rapid increase in moisture on the 18<sup>th</sup> helped produce some more concentrated heavy rainfall, with up to 7 inches falling over water off the north coast of Puerto Rico overnight in the 18<sup>th</sup>. There was also some moderate rainfall in the north coastal basins including the Rio Guajataca, Rio Grande de Manati, Rio Cibuco and Rio de la Plata. 24-hour rainfall reached 1.58" at Lares (LARP4), 1.30" at Utuado (UTKP4), 1.20" at Corozal (CORP4), 1.06" at Lago Guajataca Dam (QUEP4) and 1.04" at Lago Guayo Dam (LGUP4). A substantial stream rise was observed on the Rio Cibuco below Corozal (CORP4), rising from around 4 to over 12 feet (FS = 13 feet) in one hour (82 cfs to 3,439 cfs).

An area of elevated moisture interacting with a weak upper trough to the west produced more widespread showers and scattered thunderstorms across Puerto Rico during the day and evening of the 19<sup>th</sup>. A Flood Watch was issued for the entire island and the U.S. Virgin islands during the afternoon and an Urban and Small Stream Flood Advisory for the central part of Puerto Rico shortly. The heaviest rain was occurred in Orocovis and Coamo municipalities, with amounts up to 4 inches estimated by radar. Another Urban and Small Stream Advisory was issued later in the afternoon covering the San Juan metro area and coastal municipalities west to Vega Baja and east to Loiza. Reports of flooded roads in the San Juan metro area the Cupey and Rio Piedras areas were received. Several streams approached bankfull stage including the forecast point at Hato Rey on the Rio Piedras (RPOP4), which crested at 12.67 feet (Flood Stage = 15 feet) or 2540 cfs around 20Z on the 19<sup>th</sup>.

Heavy rainfall continued in the afternoon over the west, and reports of flooding were received from Emergency Management in Mayaguez and Hormigueros. The continued heavy rains prompted the issuance of a Flash Flood Warning for Hormigueros, San German, Mayaguez and Cabo Rojo municipalities. Unofficial reports of 4.55" in 12 hours in San German were received from the amateur radio network, and WSR-88D estimates reached 5 to 7 inches in this area. Several rivers and streams rose to near bankfull, with the Rio Hormigueros forecast point (HORP4) climbing to near flood stage at 18.9 feet (Flood Stage = 20 feet).

By early morning a large area of showers and a few embedded thunderstorms began moving across the eastern side of Puerto Rico and a Flood Watch was issued for all of Puerto Rico except for the north central and northwest. Flooded roads were reported in the Naguabo area along roads 31 and 190. More roads in the San Juan area were flooded by up to an inch of rain in under an hour, including the Baldorioty (Route 26) and Robert Todd Ave. Quebrada San Jose was reported nearing its bankfull stage. 24-hour rainfall totals (ending 12Z 4/20) across the island were as usual highly variable, with 3.98" at Orocovis DCP (BAUP4); 3.07" at Yabucoa Alert (ZJAP4), 2.57" at Corozal (CRZP4), 2.45" at Utuado (UTKP4) and 2.43" at San Lorenzo (SLMP4). The Flood Watch was maintained throughout much of the day on the 20<sup>th</sup>, as copious moisture remained in place across the island

(precipitable water was 2.12" on the 12 Z sounding). However, extensive cloudiness inhibited instability and rainfall activity remained scattered with only isolated pockets of heavier rainfall during the day. The Flood Watch was cancelled during the evening of the 20<sup>th</sup> with no further problems.

Convective activity over the next week or so remained primarily scattered, with higher amounts confined to the higher terrain over the western interior. The heaviest amounts fell in portions of the upper Rio Guanajibo Rio Grande de Anasco and Rio Yauco basins during the late afternoon of the 24<sup>th</sup>. An Urban and Small Stream Flood Advisory was issued for several municipalities as radar estimated amounts of 3 to 4 inches over a small area. Sabana Grande (ZOBP4) had 3.78"; San Sebastian (SEBP4), 2.30"; San German (GSGP4), 1.40"; Yauco (YACP4), 1.26" and Rio Rosario near Hormigueros (MAYP4), 1.09".

Available moisture increased in subsequent days to near 2 inches of precipitable water by the morning of the 26<sup>th</sup>. A line of showers developed that day around noon and produced some moderate to heavy rainfall over parts the greater San Juan area, prompting the issuance of an Urban and Small Stream Flood Advisory. Radar-estimated rainfall amounts exceeded 2 inches in an hour. Rainfall was very intense over parts of Toa Baja, Bayamon and Catano, where radar estimates approached 5 inches in several hours and a Flash Flood Warning was issued for this area. There was a report of a high school building and two houses being flooded in Toa Baja by emergency management. A cluster of heavier showers and isolated thunderstorms developed over the western interior extending to the northwest coast during the afternoon which prompted the issuance of an Urban Small Stream Advisory for 11 municipalities in this area. Rainfall was most intense in the Utuado area and in the lower Rio Culebrinas basin near Moca. A Flash Flood Warning issued in the late afternoon for Utuado municipality in an area where radar estimates exceeded 6 inches. Reports of a small stream out of its banks near road number 10 and a landslide along road 603 were received by the NWS. Total 24-hour precipitation from rain gages was considerably lower than radar estimates. These included 2.49" at Rio Espirito Santu (VEDP4); 2.40" at Aguada 2E (ADAP4); 2.35" at Rio Icacos near Naguabo (NGIP4); 2.32" at Barrio Roncador near Utuado (UTKP4); and 2.19" at Rio Mameyes near Sabana (MSAP4).

Convective activity diminished considerably on the 27<sup>th</sup> as available moisture decreased, but heavier showers and storms broke out in several locations on the 28<sup>th</sup>. An Urban/Small Stream Advisory was issued in the mid-afternoon hours of the 28<sup>th</sup> for parts of the San Juan metro area westward to Dorado as up to 2 inches fell in around an hour. The rain gage at Hato Rey on the Rio Piedras (RPOP4), just southeast of the heaviest rain area measured 1.22" in less than 30 minutes. Some residences were reported flooded in the Guaynabo and Catano areas. Other pockets of moderate to heavy rainfall were scattered around the island, with the highest total at Naguabo (NGKP4), at 2.26", followed by Rio Piedras at Hato Rey (RPOP4), 1.56"; Pueblito del Rio (GUSP4), 1.40" and Hwy. 404 nr Moca (MOCP4), 1.35".

The 29<sup>th</sup> saw concentrated convection over southwest parts of the island, primarily in parts of the Rio Hormigueros basin. An Urban/Small Stream Flood Advisory was issued for 5 municipalities in this area in the afternoon, and was quickly followed by a Flash Flood Warning for Hormigueros and San German. Sabana Grande municipality was put under a Flash Flood Warning after radar rainfall estimates reached 4 to 6 inches over a small area. The Rio Hormigueros reacted quickly reaching 19.0 feet (Flood stage = 20 feet) in several hours. PREMA reported a mudslide covering Route 361 in San German county and five feet of water over a road number 114. Rainfall estimates from radar indicated up to 8 inches fell in some 4 to 6 hours, although no rain gages were available in this area to corroborate these estimates. The highest gage 24-hour rainfall total was only 1.16" at Pueblito

del Rio (GUSP4), followed by 1.14” at Rio Rosario (MAYP4) near Hormigueros. No other amounts above 1 inch were observed.

Non-Routine Hydrologic Products Issued:

Hydrologic Outlooks (ESFSJU):	<b>0</b>
Flood Watches (FFASJU):	<b>2</b>
Flood Warnings (FLWSJU):	<b>0</b>
Flash Flood Warnings (FFWSJU):	<b>5</b>
Urban/Small Stream Flood Advisories (SJUFLSSJU):	<b>12</b>

cc: USGS Caribbean District  
USCE Jacksonville Division  
SRH Climate, Weather and Water Division  
SERFC  
NWS Hydrologic Information Center  
Southeast Regional Climate Center

Figure 1.

